

## A Survey of Maternal and Perinatal Deaths in Health Facilities in Sokoto State

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### Abstract

#### Background

In Nigeria Maternal Mortality ratio 512/100000 live birth and Perinatal Mortality rate 39/1000 live births are unacceptably high and is on the increase with Post-partum haemorrhage and Birth Asphyxia as the leading cause respectively.

**Aim:** To develop key evidence based intervention strategies for prevention and management of causes of maternal and perinatal mortality in Sokoto state to promote well-being at personal, community and workplace to reduce mortality.

**Materials and Methods:** A retrospective study of 320 secondary data analysis of maternal and perinatal deaths records in 34 public health facilities over 12 months, 1 July 2017 to 30th June 2018, prior to survey in Sokoto state, was conducted using purposeful sampling technique, a semi-structured questionnaire; maternal deaths, perinatal deaths, causes of deaths, notification of

deaths, review of deaths, recommendations made for each review and if action was taken. Data was analyzed using descriptive statistics in excel.

**Result:** Total number of deliveries of 11343. Total deaths of 320 with Maternal (80) and Perinatal deaths (214) mean age were  $20.0 \pm 5.0$  years and  $3.5 \pm 2$  days respectively. About 59% of maternal deaths were in the age group 15-24 years with mean age  $20.0 \pm 5.0$  years with a range of 15 - 49 years. About 79% of deaths were in the age group 1-6 days with mean age  $3.5 \pm 2$  days a range of 1 to 7 days. 126(64%) of perinatal deaths were male while 88(36%) were females. 73 (92.1%) direct and 6 (7.8%) indirect cause of maternal deaths respectively. 34(42.4%) Eclampsia, 22(28.0%) post-partum haemorrhage, 11(14%) prolong obstructed labour, 5 (6.5%) antepartum haemorrhage, 1(1.3%) unsafe abortion 1 (1.3%) severe malaria and 5(6.5%) anaemia. No documented congenital abnormalities. 13(59%) maternal and 9(41%) perinatal deaths were notified. 4(31%) maternal deaths 2(22%) perinatal deaths notified were reviewed. Health facility Obstetrics case fatality rate Post-Partum Haemorrhage (12.2%), Eclampsia(14.1%), Antepartum haemorrhage (4.9%), Prolong obstructed labour (6.4%),Unsafe abortion(0.7%),Sepsis(1.1%) and Indirect causes(0.2%). Health facility Perinatal case fatality rate Birth Asphyxia (21%),Tetanus (100%),Prematurity (11%), Sepsis (1.6%), Congenital Abnormality (0%) , Indirect (3.2%). Maternal Mortality ratio 705/100000 live birth and Perinatal Mortality rate 19/1000 live birth per year projected.

**Conclusion:** Maternal and Perinatal mortality abound as public health importance level among study area; continuous deaths surveillance, deaths notification, data analysis, deaths reviews and strategic implementation will accelerate reduction of maternal and perinatal deaths in Sokoto State.

**Keywords:** Maternal, Perinatal, Cause of Deaths, Notification, Review, Sokoto State, Nigeria.

## 1. INTRODUCTION

In Nigeria Maternal Mortality ratio 512/100000 live birth and Perinatal Mortality rate 39/1000 live births are unacceptably high and is on the increase with Post-partum Haemorrhage and Birth Asphyxia as the leading cause respectively. (NDHS 2018)<sup>1, 11</sup>

Reporting and tracking maternal and perinatal deaths and response to reduce preventable deaths remain a major challenge in Nigeria<sup>7</sup>. It is generally agreed that most causes of maternal, neonatal, infants and under-five mortality are preventable through systematic public health education and strengthening of the health system blocks which deal with the three delays: i.e delay in recognizing and deciding to seek appropriate care, delay to access appropriate health care and delay in receiving quality care with in a health facility<sup>9</sup>. Achieving the latter is pivoted in Nigeria on Maternal and Newborn death audits and response and implementation of the recommendations made from the death audits called Maternal and Perinatal Deaths Surveillance and Response (MPDSR)<sup>7</sup>

Maternal and Perinatal Deaths Surveillance and Response (MPDSR) is a form of continuous surveillance that links the health system and quality improvement processes from local to national levels, which includes the routine identification, notification, quantification and

determination of causes and avoidability of all *maternal and newborn deaths*, as well as the use of this information for actions that will prevent future deaths<sup>7</sup>.

The Federal Ministry of Health, in collaboration with the professional Associations; (Society of Gynaecology and Obstetrics of Nigeria (SOGON) and Pediatric Association of Nigeria (PAN), as well as Nigerian Society of Neonatal Medicine (NISONM), Development partners and other stakeholders in reproductive, maternal and child health in Nigeria, provided technical support for routine tracking of all maternal and perinatal deaths in Nigeria in the last couple of years<sup>6,7</sup>.

There are two tertiary, twenty seven secondary and eight hundred and seven primary health care facilities in Sokoto State. At the clinical level, mortality audit is a common practice, especially in tertiary and teaching health facilities<sup>1</sup>. Implementing MPDSR in Nigeria and particularly in Sokoto state followed Universal Health Coverage in all its processes. This process is what the retrospective study looked into on the impact of MPDSR in Sokoto State so far in the 12 months preceding the collection of the data. Sokoto State has taken steps to institutionalize and establish MPDSR at all levels<sup>1</sup>.

The results of this study provided important information that could be used to develop key intervention strategies targeted at the prevention and clinical case management of causes of maternal and perinatal deaths in Sokoto state to promote the general health and well-being of these families at personal, community and workplace level thus reducing maternal and perinatal mortality in Nigeria.

## **2. METHODOLOGY**

### **2.1 Baseline information**

A secondary data analysis of maternal and perinatal deaths was carried out in one tertiary health facility, seven secondary health facilities and twenty four Primary Health Facilities. There were 249 units of secondary data of maternal and perinatal deaths within 12 months before the study.

### **2.2. Inclusion and Exclusion criteria**

The study population included case definition of maternal and perinatal deaths. All maternal and perinatal deaths that from registers that occurred in the health facilities within the randomly selected facilities. Respondents outside the health facilities that were not in the register, and non-maternal deaths were excluded from the study.

**2.3. Study Design:** A secondary data analysis from maternal and perinatal register in maternity and newborn units of secondary health facilities and Primary Health Centers with delivery records.

**2.4. Study Area: Table 1. Showing study area and health facilities.**

	<b>First Batch (Eastern Senatorial Zone)</b>	<b>Second Batch(Western Senatorial Zone)</b>	<b>Third Batch(Central Senatorial Zone)</b>
<b>LGAs</b>	Wurno Gwadabawa	Bodinga Gange/Shuni	Sokoto North Sokoto South Wamako
<b>Tertiary Health Facility</b>	<b>NIL</b>	<b>NIL</b>	1 Usman Danfodio University Teaching Hospital,
<b>Secondary Health Facility</b>	Wurno and Gwadabawa General Hospitals	General Hospitals Bodinga Gange/Shuni	1 Specialist Hospital, 1 Military Hospital, 1 Maryam Abacha Hospital,
<b>Primary Health Facility</b>	Wurno a. Kandam b. Adinma c. Dinawa d. Wurno Gwadabawa  Gigane Salome Gigan-Bango Mamsuka Gwadabawa Gidan kay	Bodinga a) Danchadi b) Dingyadi c) Sifawa d) Bagarawa Gange/Shuni  a) Kwanawa b) Fajaldu c) Dange d) Rikina e) Amanawa	Sokoto North a. Rumbukawa b. Kofar-Kade c. Sambo d. Women and Child Hospital Sokoto South a. Gagi b. Yar Akija c. Gdahala

**2.5. Study Size**

There were 320 units of secondary data of maternal and perinatal deaths within 12 months before the study from 34 health facilities.

**2.6. Sampling technique**

The study facilities were purposefully selected using the HFs that conduct deliveries<sup>1</sup>. These are facilities where deliveries take place. The study size was numbers of maternal and perinatal deaths recorded in the register over 12 months before the study in all the facilities where deliveries take place under Skilled Birth Attendance<sup>1</sup>.

## **2.7. Study Instruments**

This include structured questionnaire, maternity unit register showing 12 months data before the study, newborn unit register showing 12 months data before the study, excel software, Biros, Calculators, Laptops, Printers, Stationeries, MPDSR National Guidelines and MPDSR National tools<sup>7</sup>

## **2.8. Data Collection**

Data was collected between July 1<sup>st</sup> 2018 and June 30<sup>th</sup> 2019. The facility were pre-informed before the day of the data collection and it took between 10-20 minutes to complete. A tabulated questionnaire/form (Revised MPDSR tracking form 4) was used to collect data from the delivery register. In addition, facility, age, sex of perinatal deaths, cause of death, number of notifications, number of deaths reviewed, recommendations and response/actions and maternal complications were collected in one tertiary health institution, seven secondary health facilities, and twenty-six primary health facilities. These facilities spread over six LGAs at two LGAs per senatorial zone.

### **2.8.1 Health Facility**

The facility were the ones that conduct deliveries. There were 2 secondary health services per LGAs and four PHCs per LGA. The names of the facilities collected with the LGA that they are located.

### **2.8.2. Age**

The age parameters of the maternal deaths collected from the registers. The age of perinatal deaths are those deaths below or equal 7 days of live. Zero age are the stillbirths either fresh or macerated stillbirths.

### **2.8.3. Sex**

Data for the determined sex variable of the perinatal deaths was collected. The maternal deaths sex variables were all females.

### **2.8.4. Cause of deaths**

The cause of deaths data as a variable was collected from the register for both maternal and perinatal deaths during the previous 12 months before the study.

### **2.8.5. Number of notifications**

This variable occurs whenever there is either maternal or perinatal death. The notification of deaths is made to LGA District Surveillance and Notification Officer (DSNO) and other health officers and policy makers<sup>7,10</sup>. The number of notifications made for deaths were collected as a variable by indicating Yes/No. Death notification precedes the death review process in the facility where the MPDSR Steering Committee is already formed<sup>1,7</sup>.

**2.8.6. Death Review**

The variable confirms if death is review or not. The review of death occur during monthly meeting of HFs. The review leads to recommendations that will lead to actions to prevent future occurrence<sup>7,9</sup>.

**2.8.7. Recommendation**

The variable measures numbers of recommendations made from the reviewed deaths. The recommendations lead to response with actions that prevent future occurrence.

**2.8.8. Response**

The variable measured the numbers of actions or response taken for all recommendations made during deaths review,<sup>7, 22</sup>.

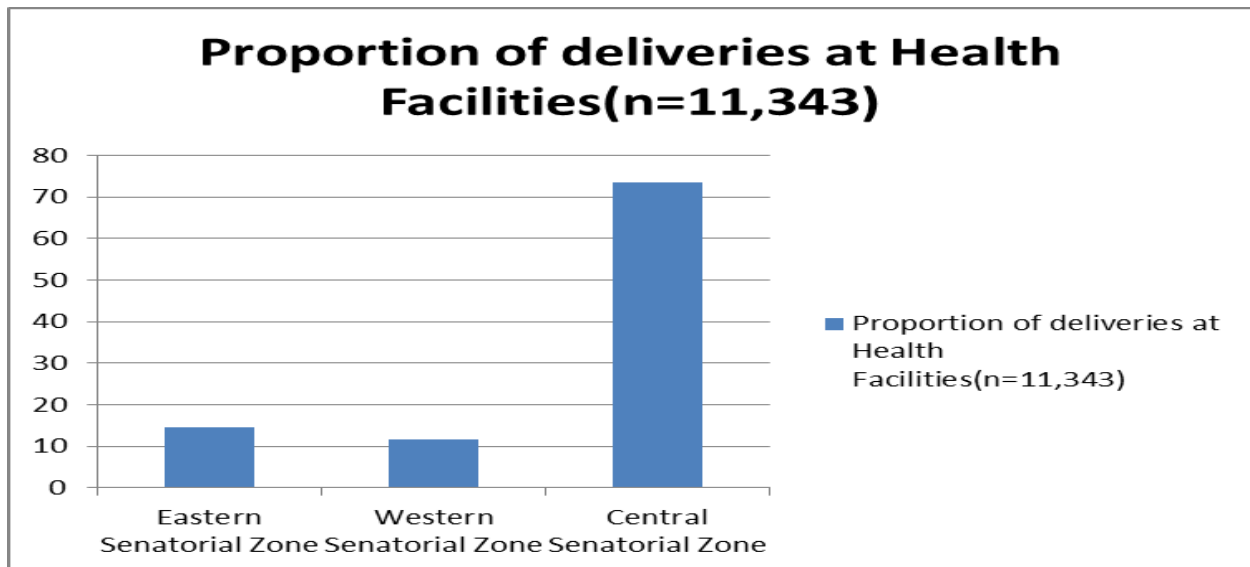
**2.9. Statistical analyses**

Data was entered into excel. All the data were cleaned before analysis was carried out. Descriptive statistics such as means, proportions, percentages and range were used to summarise the data.

**3. RESULTS**

**3.1. Socio-Demographic characteristic of Maternal and Perinatal Deaths**

A total of 11,343 deliveries of which maternal (80) and perinatal (214) deaths occurred in 34 health facilities over 12 months period from the time of study. One tertiary, seven secondary and twenty-six primary health care facilities were involved in the study. 26 maternal severe complications (direct and indirect) were treated in tertiary institution as referrals.



**Fig. 1**

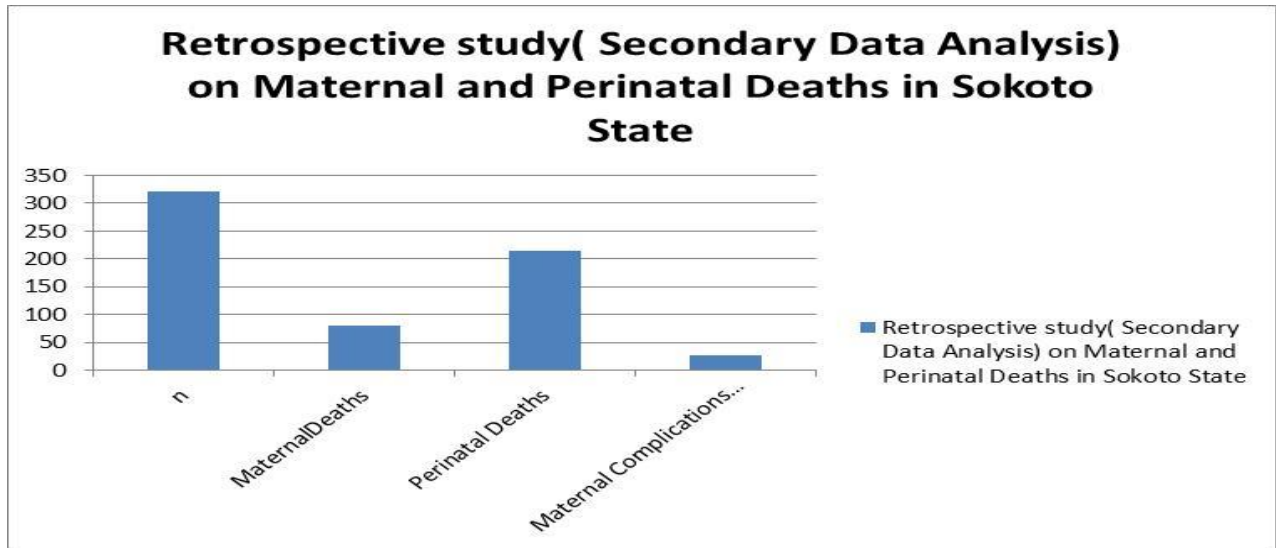


Figure 2.

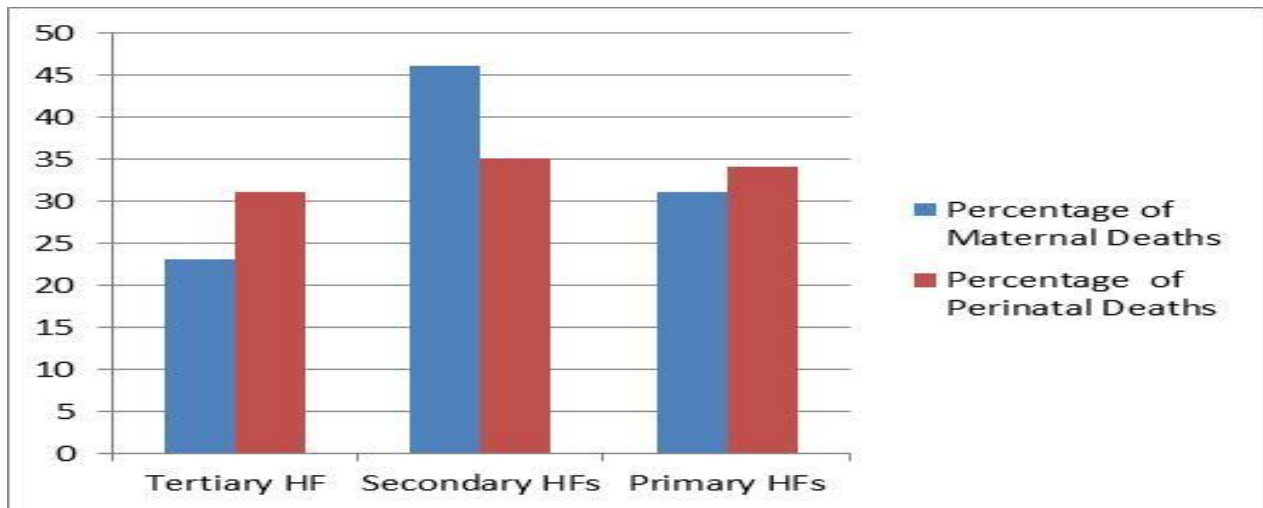


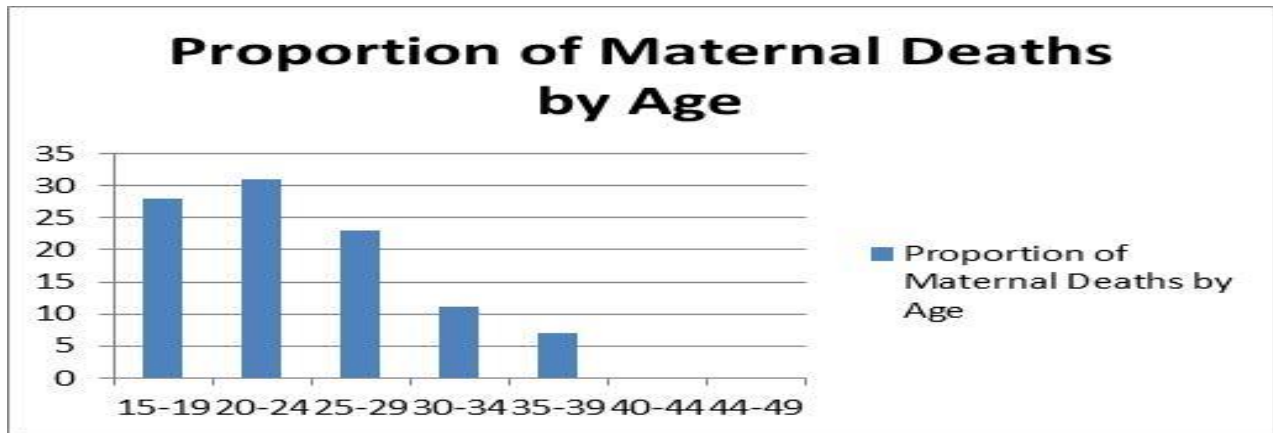
Figure 3

**3.1.1. Maternal deaths**

About 59% of deaths were in the age group 15-24 years and their mean age  $20.0 \pm 5.0$  years with a range of 15 to 49 years.

**Table 2: Showing age distribution of Maternal Deaths in Sokoto State**

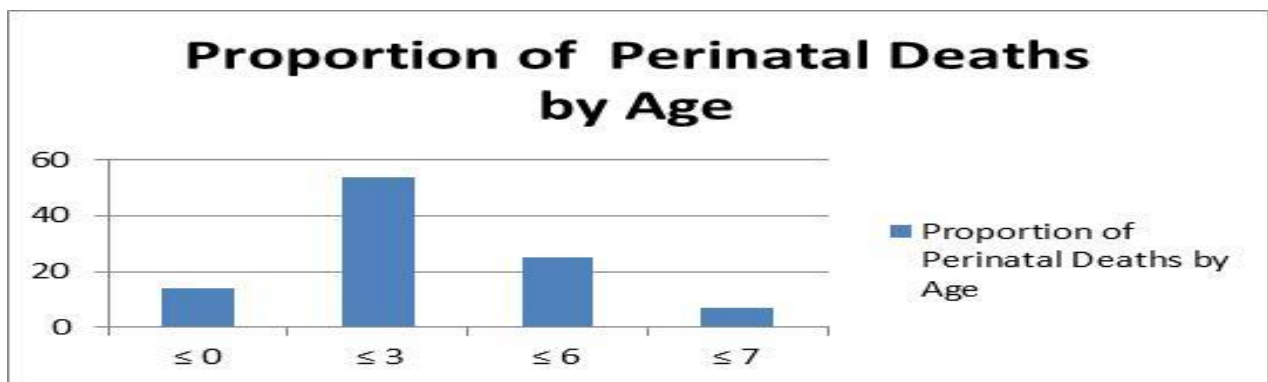
Age	Proportion (%) of Maternal Deaths by Age
15-19	28
20-24	31
25-29	23
30-34	11
35-39	07
40-44	0
44-49	0



**Figure 4.**

**3.1.2. Perinatal deaths**

About 79% of deaths were in the age group 1-6 days and their mean age  $3.5 \pm 2$  days with a range of 1 to 7 days. 126 (64%) of perinatal deaths were male while 88 (36%) were females.



**Figure 5**



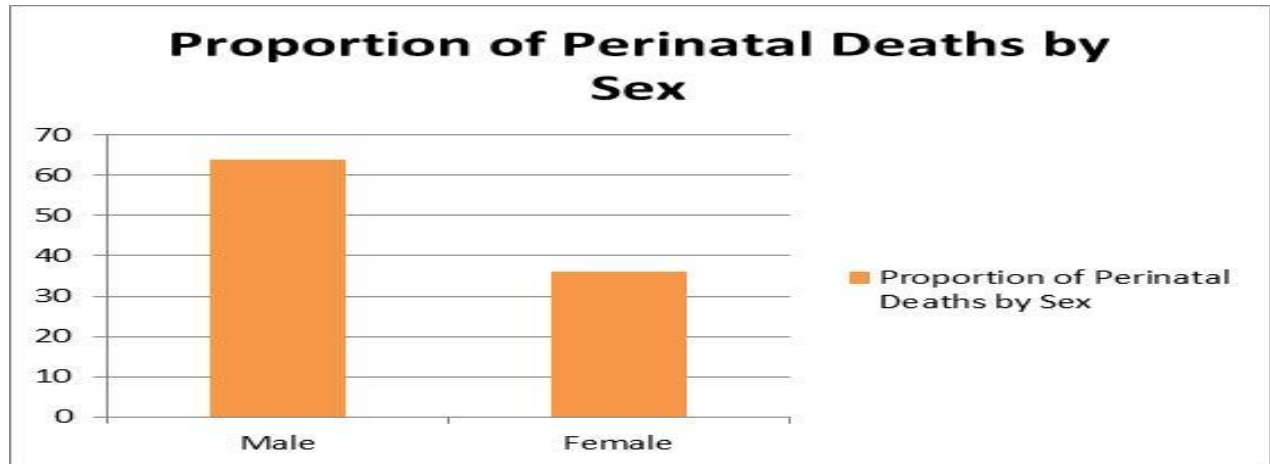


Figure 6

### 3.2. Cause of Death

#### 3.2.1. Cause Maternal deaths

There was 73 (92.1%) direct and 6 (7.8%) indirect cause of maternal deaths respectively. For direct causes; 34 (42.4%) Eclampsia, 22 (28.0%) post-partum haemorrhage, 11 (14%) prolong obstructed labour, 5 (6.5%) ante-partum haemorrhage, 1 (1.3%) unsafe abortion while documented indirect cause limited to 1(1.3%) severe malaria and 5 (6.5%) anaemia of unknown cause.

Disaggregation of cause of maternal deaths by zone showed the highest as east 8 (10% ) post-partum haemorrhage, west 14 (17.5% ) eclampsia, central 5 (6.3%) antepartum haemorrhage,



Figure 7

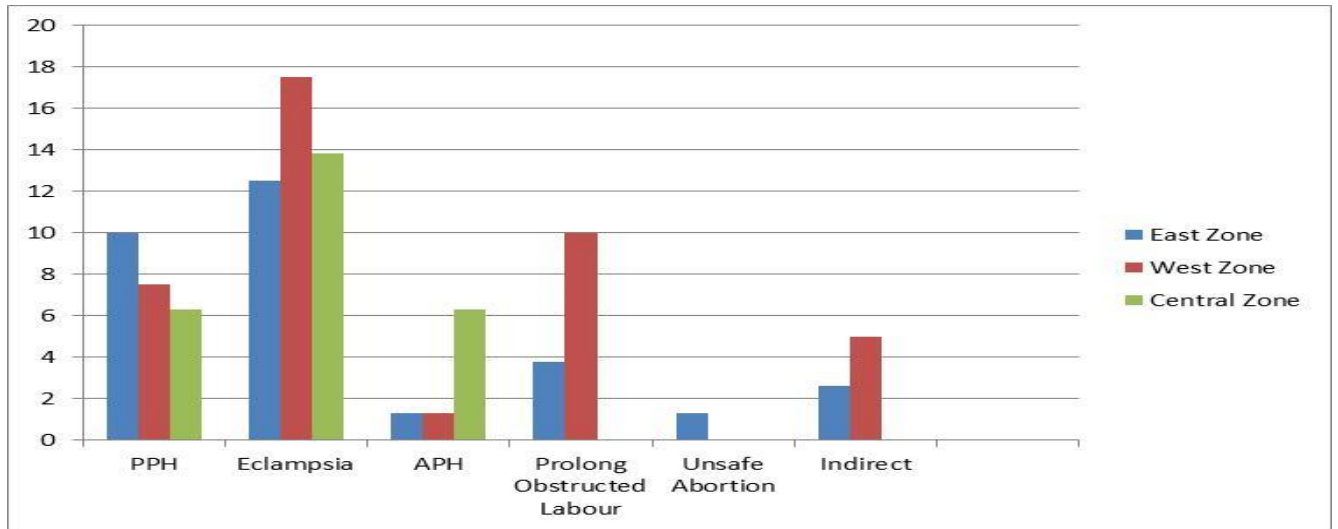


Figure 8

3.2.2. Perinatal deaths

About 62 (43.3.1%) birth asphyxia, 20 (14.0%) prematurity, 28 (19.5%) sepsis, 20 (14.0%) stillbirth, 1 (0.7%) tetanus and 12 (8.4%) others. No documented congenital abnormalities.

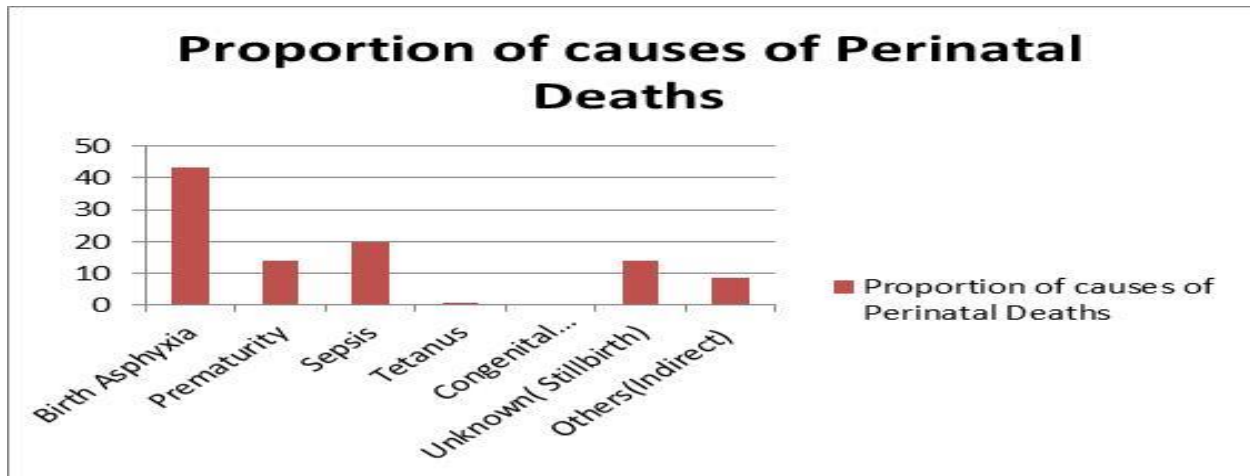


Figure 9

3.3 Notification of deaths

22(7%) maternal and perinatal deaths were notified to appropriate authorities for action. 13 (59%) maternal and 9(41%) perinatal deaths notified.

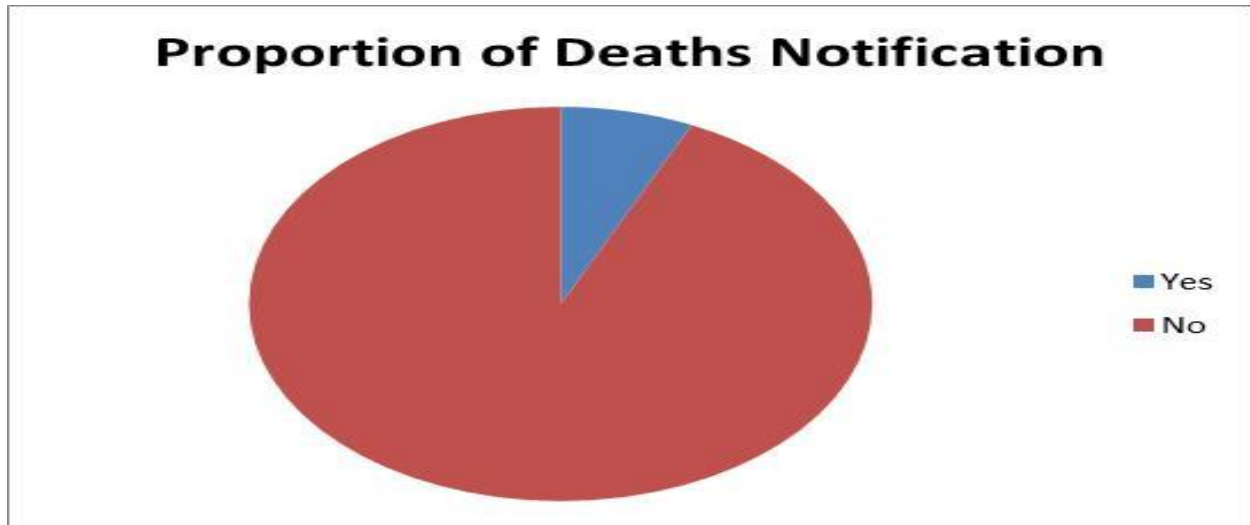


Figure 10

### 3.4 Death review

4 (31%) maternal deaths notified were reviewed. 2 (22%) perinatal deaths notified were reviewed.

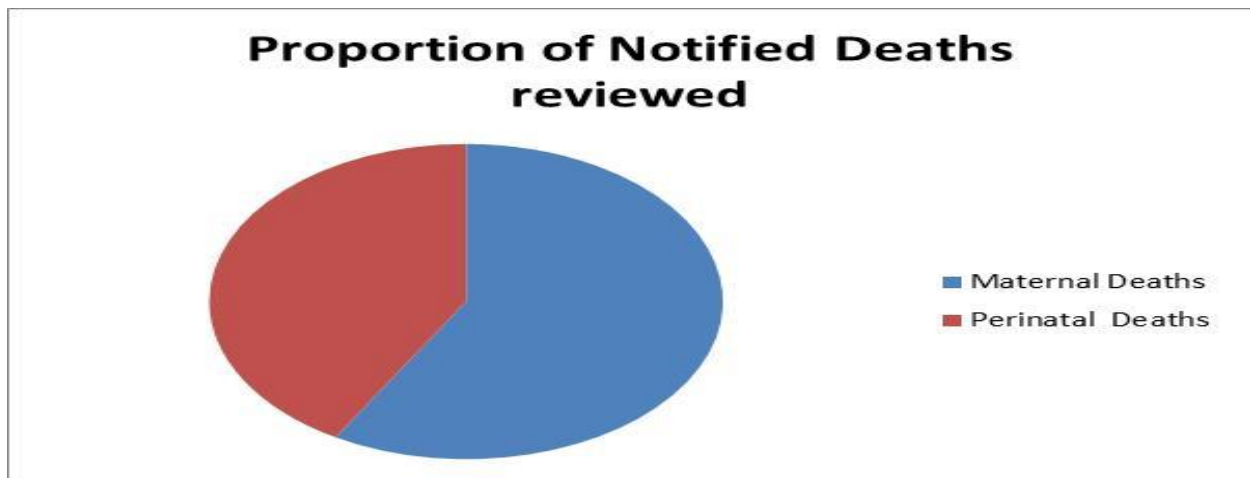


Figure 11

### 3.5 Recommendation and response

Out of 8 recommendations made during 4 maternal deaths reviewed it was found that no actions were taken on any of these recommendations.

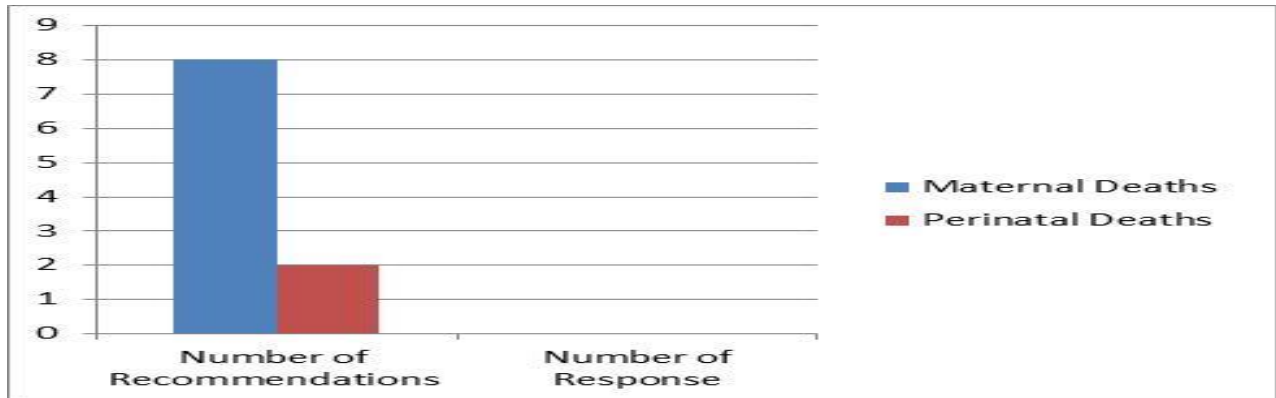


Figure 12

### 3.6 Health Facility Obstetrics Case Fatality rate by Zone

The number of deaths from the specified complications in the facility during the specified time period; the number of women diagnosed with one or more of these complications attended at the emergency obstetric care (EmOC) facility during the specified time period<sup>10,17</sup>. This indicator measures facility performance, in particular, quality and promptness of care. It is an indicator used for alert warning in surveillance of mortality and morbidity<sup>9,10</sup>.

In this study the table below shows the obstetrics case fatality of the health facilities by zone. The figures tell us the numbers of deaths that must not be exceeded in every 10/100 maternal complication. This cut – off is the alert warning point that will be notified. The lower the CFR the better the HF performance. Health Facilities in Western Senatorial Zone performed worse in MNCH health services with this period. Health Facilities in the Central Senatorial Zone performed best.

Table 3. Showing Zonal Health Facility Obstetrics Case Fatality Rate (CFR)

Maternal Health Complications	CFR of HFs located East Senatorial Zone	CFR of HFs located in West Senatorial Zone	CFR of HFs Located in Central Senatorial Zone	Average CFR for HFs Sokoto State
Post-Partum Haemorrhage	21	33	5	12
Eclampsia	19	37	7	14
Ante-partum Haemorrhage	3	7	5	5
Prolong Obstructed Labour	6	35	0	6
Unsafe Abortion	1	0	0	1
Sepsis	2	0	0	1
Indirect Causes of deaths	0.05	1	0	<1

**Table 4. Showing Health Facility Perinatal Case Fatality Rate (CFR)**

Perinatal Health Complications	Health Facilities Perinatal CFR in Sokoto State
Birth Asphyxia	21
Tetanus	100
Prematurity	11
Newborn Sepsis	1.6
Congenital Abnormality	0
Indirect Causes of Perinatal deaths	3.2

### 3.7 Hospital Maternal Mortality ratio and Perinatal Mortality Rate

In the study projected Hospital Maternal Mortality ratio is 705/100000 live birth and Hospital Perinatal Mortality rate 19/1000 live birth per year.

## DISCUSSION, RECOMMENDATION AND CONCLUSION

### 4.0 Discussion

#### 4.1 Socio-Demographic characteristic of Maternal and Perinatal Deaths

In Nigeria, our current statistics indicates that, our maternal mortality ratio is 512 per 100,000 live births and Under 5 mortality rate stands at 132 per 1000 live births while the neonatal mortality rate is 39 per 1000 live birth<sup>12</sup>. Therefore, we still have a lot to do in reducing the high maternal mortality ratio and neonatal mortality rate. These audits will contribute greatly to reduction of maternal and perinatal mortality in Nigeria if implemented correctly.

In this study the prevalence of maternal deaths (59%) is highest within the age group of 15-24 which is in line with Eclampsia as the most prevalence cause of maternal deaths in Sokoto State. There were more perinatal deaths at the primary and tertiary health facilities. Primary health facilities are the first point of call during labour. This may be due to unavailability of resuscitation equipment and unskilled birth attendants at the PHC. There were more maternal deaths at the secondary health facilities. The secondary facility is the first referral center of which may be delayed most time<sup>1</sup>. Most of the perinatal deaths occur on the 3<sup>rd</sup> day of life<sup>8</sup>. More of perinatal deaths were males in this study. This is in line with a study that showed more males are prone to deaths after births especially in prematurity<sup>8</sup>.

#### 4.2 Cause of Death

In Nigeria in NDHS 2008 and 2013 respectively, Haemorrhage from (23%) to (24%), Hypertensive diseases from (11%) to (12%), Infections reduce from (17%) to (15%), Obstructed labour from (11%) to (8%) , Unsafe abortion from (11%) to (13%), Indirect causes (20%) and other direct causes (8%)<sup>6</sup>.

This study showed that prevalence of cause of maternal deaths in Sokoto state are 34(42.4%) Eclampsia, 22(28.0%) post-partum haemorrhage, 11(14%) prolong obstructed labour, 5(6.5%) antepartum haemorrhage, 1(1.3%) unsafe abortion 1(1.3%) severe malaria and 5(6.5%) anaemia. Eclampsia caused more deaths within the study period than the national where the PPH is the

most prevalent cause of deaths. This is in keeping with the most average age of maternal deaths in this study. The result also indicated that there are different most causes of maternal deaths by zone. This will be effective for planning. In this study the most prevalence of cause of Perinatal deaths in Sokoto State is Birth Asphyxia followed by Prematurity and sepsis which is in line with national trend.

#### ***4.3 Notification of Deaths***

This study revealed that there was less deaths notification than maternal and perinatal deaths. This led to less deaths reporting rate to WHO, NCDC and NPOPC in Sokoto State<sup>23,25</sup>. The health facility case fatality for warning alert is compromised in Sokoto State<sup>10</sup>.

#### ***4.4 Deaths Review***

Less than half of deaths notified were reviewed. This will cause inadequate response due to low deaths reviewed and thus reduced recommendations. Thus there is set back to the reduction of maternal and perinatal in Sokoto State.

#### ***4.5 Health Facilities Obstetrics Case Fatality Rate***

The Health facility Obstetrics case fatality rate for all complications are worse in the facilities in West Senatorial Zone. They are three times the state CFR. Eclampsia has worst CFR. This is followed by Prolong Obstructed labour and Post-Partum haemorrhage. This is a reflection of poor skilled birth attendance, infrastructures, inadequate medicine and supplies, poor supervision, poor data entering and non-establishment and conduction of MPDSR processes etc. There is need for fact finding mission and supervision to this zone.

#### ***4.6 Health Facilities Perinatal Case Fatality Rate***

The Health Facilities perinatal case fatality rate showed that Tetanus has the worst CFR which is followed by Birth Asphyxia and Prematurity respectively. It means neonatal tetanus still occurring despite vaccination programme. This is likely from the unbooked mothers at the facility or home deliveries. There is need to step up campaign against home deliveries and promote facility ANC and deliveries.

#### ***4.7 Maternal Mortality ratio and Perinatal Mortality Rate***

The MMR in this study for Sokoto state is higher than national figure. The PMR in this study is lower than the national figure.

### **5.0 Limitations/Challenges**

1. Small sample frame.
2. Poor record keeping of health facility registers

### **6.0 Recommendations**

1. Establishment of Health facilities MPDSR Committee in all facilities according to national guidelines.

2. Commencement and immediate scale up of Community MPDSR in Sokoto State.
3. Improve on referral system
4. Decentralization of Transfusion services at sub national level by establishing Blood Bank Systems in all Secondary and Tertiary Health Institutions.
5. Increase availability of UN Life Saving security commodities in all the Health Facilities
6. Autonomy for Secondary health facilities
7. On Job capacity building on MLSS, LSS and ELSS.
8. There is need for adequate monitoring and supervision of facility MPDSR operations.
9. State Ministry Of Health should ensure electronic data management in all health facilities and community MPDSR in the state for prompt data collection, entry, collation and analysis and action.
10. All Health Facilities MPDSR Steering Committee be supported to hold deaths review meetings regularly, follow up recommendations for actions and revert back to committee for appraisal as in the National MPDSR Guidelines.

### **7.0 Conclusion**

Maternal and Perinatal mortality abound as public health importance level among study area; therefore, continuous surveillance, community out-reach and dialogue, health education during ANC, calculation of health facility case fatality rate for warning alert during surveillance, improve maternal and perinatal deaths notification and reviews and ensured referral of maternal and perinatal complications for treatment in the high level health facilities are advised. Maternal and Perinatal Deaths Surveillance and Response implementation will accelerate reduction of maternal and perinatal deaths.

### **8.0 Acknowledgement**

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